

CLAIMS

1. An exhaust gas purifying device in an internal combustion engine including a plurality of exhaust paths placed in parallel, comprising:

5 a plurality of collectors for collecting unclean substances included in exhaust gas, the collectors being respectively provided to the exhaust paths;

10 a plurality of differential pressure detecting means for detecting a differential pressure between upstream and downstream of each of the collectors; and

15 flow rate estimating means for estimating an exhaust gas flow rate of each of the exhaust paths based on differential pressure information respectively obtained by the differential pressure detecting means.

2. The exhaust gas purifying device according to claim 1, wherein the flow rate estimating means estimates the exhaust gas flow rates when the unclean substances are completely removed from the collectors by a regeneration process of the collectors.

3. The exhaust gas purifying device according to claim 2, wherein the flow rate estimating means estimates the exhaust gas flow rates without executing the regeneration process when the internal combustion engine is initially actuated.

4. The exhaust gas purifying device according to any one of claims 1 to 3, comprising energy estimating means for estimating the exhaust gas energy of each of the exhaust paths based on the exhaust gas flow rate of a corresponding exhaust path estimated by the flow rate estimating means.

35 5. The exhaust gas purifying device according to claim 4, wherein the energy estimating means includes flow rate

detecting means for detecting an air flow rate led into the internal combustion engine and temperature estimating means for estimating a temperature of exhaust gas.

5 6. The exhaust gas purifying device according to one of claims 4 and 5, in which a pair of the collectors is provided, and the energy estimating means estimates the exhaust gas energy respectively corresponding to the collectors based on the two differential pressures detected by the differential 10 pressure detecting means respectively corresponding to the pair of collectors.

7. The exhaust gas purifying device according to any one of claims 1 to 3, further comprising:

15 calculating means for acquiring a basic value of the exhaust gas flow rate of each of the exhaust paths based on a value acquired by dividing the air flow rate led into the internal combustion engine by the number of the exhaust paths, wherein the flow rate estimating means acquires the 20 exhaust gas flow rates by correcting each of the basic values based on differential pressure information respectively obtained by the differential pressure detecting means.

25 8. The exhaust gas purifying device according to claim 7, wherein the flow rate estimating means determines whether or not to correct the basic value based on variations in differential pressures respectively obtained by the differential pressure detecting means.

30 9. The exhaust gas purifying device according to any one of claims 1 to 8, wherein the internal combustion engine includes a supercharger for supercharging air to the internal combustion engine by using the exhaust gas flow.

10. An exhaust gas purifying method for an internal combustion engine including a plurality of exhaust paths placed in parallel, comprising:

5 collecting unclean substances included in exhaust gas with a plurality of collectors respectively provided to the exhaust paths;

detecting a differential pressure between upstream and downstream of each of the multiple collectors; and

10 estimating an exhaust gas flow of each of the exhaust paths based on the detected differential pressure information.

11. The exhaust gas purifying method according to claim 10, further comprising:

15 acquiring a basic value of the exhaust gas flow of each of the exhaust paths based on a value acquired by dividing the air flow rate led into the internal combustion engine by the number of the exhaust paths; and

20 acquiring the exhaust gas flow rates by correcting each of the basic values based on differential pressure information respectively obtained by the differential pressure detecting means.